



Ceiling HEPA/UVGI Air Solutions Product Highlights

Function: Used for infection control in medical facilities or laboratories, or in any commercial application requiring highly efficient particulate and pathogen removal. Units are used to clean HVAC supply air, clean and recirculate room air, or to create negative pressure.

Technology: HEPA Filtration and Ultraviolet Germicidal Irradiation (UVGI)

High Efficiency Particulate Air Filters (HEPA): For over eighty years HEPA filters have been the primary mechanism used for removing airborne pathogens, microorganisms, dust, and particulate from the air at very high efficiencies. Standard certified HEPA filters are 99.97% efficient at .3 microns and higher, meaning they are individually tested to perform at that efficiency. If a product contains a HEPA filter that is not certified, then it may not perform at HEPA efficiency. This is the case with many commercial units that claim to have HEPA filters or “true” HEPA filters, in that in many instances the media may be HEPA efficiency but it is not adequately gasketed within the filter frame (so there is bypass around the media). “Certified” HEPA filters are individually DOP tested to ensure efficiency. The HEPA filters used in the PAS ceiling product line are all reverse gel seal filters certified to perform at 99.99% efficiency at .3 microns, and the HEPA filter is securely sealed within the cabinet to prevent air bypass around it.

Ultraviolet Germicidal Irradiation: UVGI has also been used as a means of destroying airborne bacteria and disease, as airborne microorganisms have been shown to be destroyed when subjected to certain levels of UV radiation. A key aspect of this is the fact that many viruses are too small to be trapped by a HEPA filter (they are less than .3 microns in size), but they are very susceptible to the effects of UV.

Furthermore, the UV lamps in the PAS ceiling product line radiate on the HEPA filter, where the dust, bacteria, and microorganisms are collected. In HEPA-only systems, mold and microbial growth will occur on the HEPA filter, so HEPA filters must be replaced at least once per year (even if the HEPA filter is not clogged). If they are not replaced, the microorganisms can actually eat through the HEPA media (this is known as bacteria grow-through), and be dispersed throughout the room. However, in the PAS ceiling product line, given the HEPA filter is constantly bathed in UV light, mold and microbial growth cannot occur.



As such, the HEPA filters in our systems can last up to three years (depending on particulate load), thereby lowering unit maintenance costs.

Applications: Medical facilities in operating rooms, TB Isolation rooms, Pharmaceutical compounding areas, intensive care units, examination rooms, Emergency Rooms, bronchoscopy/sputum rooms, and waiting areas for cleaning room air, supply air, or creating negative pressure. Also used in laboratories (tissue culture or other high risk labs), homeless shelters, AIDS clinics, or anywhere there is a high risk of airborne bacteria and disease.

Other applications include commercial facilities for dust, mold, and microorganism removal, such as computer centers, doctor/dentist offices, day care centers, morgues, and general office space.

Versatility of Operation: There are three available functions of the PAS ceiling units:

- 1) The units can be installed as part of an HVAC system, with the goal of cleaning supply air into a room. In this application, the units replace standard ceiling diffusers, effectively cleaning and disinfecting supply air going into specific rooms. In this function, they are often used to either disinfect supply air into clean rooms/hospital areas (such as above the table in operating rooms), or to help eliminate the contaminants and health concerns associated with Sick Building Syndrome (SBS) in non-medical applications. In this configuration, they can also be used to create Positive Pressure in rooms.
- 2) By installing the unit in conjunction with our **Recirculation Kit**, the units can be installed as complete in-room air recirculation units. The Recirculation Kit includes a return grille, wall-mount speed switch, ductwork, and all of the necessary hardware for installation. A standard unit with a 12" diameter collar is installed into the ceiling, and it is then ducted to the return grille on the other side of the room. As such, when the unit is running, dirty air is pulled out of the room through the return grille, sent through the unit and cleaned, before being deposited back into the room. Installing a unit in this manner creates an effective whole room air cleaner that does not take up valuable floor space.
- 3) When as a Negative Pressure unit, each PAS ceiling unit is configured to pull room air into ductwork and exhaust it outside or to another area so as to create negative pressure in high risk infection control applications.



Location: The PAS ceiling product line offers an efficient and effective air solution containing hospital-grade technology, without taking up valuable floor or wall-space. Because of this, it is ideal for hospital and medical (doctor/dentist offices) applications, where medical equipment typically takes up most available space. By the same token, the PAS ceiling product line is ideal for Day Care Centers (where infection control is a concern), but where the equipment needs to be out of reach of the children.

Negative/Positive Pressure Options: The units can be installed to create positive or negative pressure, depending on the direction of the air flow. In the Negative Pressure model ("-NP"), room air is drawn into the unit's grill, through the filtration technologies, and through the 12" collar where it is forced into ductwork for exhaust. In the Positive Pressure model ("-PP"), supply air from the HVAC system flows through the 12" collar, through the filtration technologies, and then is dispersed into the room through the grille. To create a negative pressure room, (such as for a TB Isolation Room or a bronchoscopy/sputum room), the unit should be installed in the room where negative pressure is desired, and the exhaust air should be sent out of the room. To create negative pressure in a TB isolation room as per CDC guidelines, exhaust flows of at least 10% greater than supply air (but no less than 50 cfm) must occur, and all existing return air should be blocked off. For instance, a room having 300 cfm supply air must have at least 350 cfm exhaust (because you need at least 50 cfm more). To create a positive pressure room, (such as for an operating room or immune-deficiency room), supply flows need to be at least 10% greater than exhaust flows.

Air Flow Pattern: When installed properly as an in-room air recirculation system, an effective air flow pattern is created capable to treating the entire room. Because the air intake and air exhaust are separated (by the length of the ductwork), "short-circuiting" of clean air does not occur. Short-circuiting happens in many air cleaners when clean exhaust air immediately gets drawn back into the unit. As a result, the same treated air is recycled without much effect on the rest of the dirty air in the room. Furthermore, with many air cleaners "dead air spots" occur throughout the room because the air cleaner is ineffective at moving and treating all of the air in the room. However, when the unit(s) is installed properly with the optional Recirculation Kit(s), an excellent and effective air flow pattern is created capable of reaching all corners of the room.



Easy Installation: Fits smoothly into standard T-Bar ceiling, with the unit being hung from support tabs located on the top of the cabinet. Side access intake or exhaust options are also available for areas having only a small amount of space for unit depth.

Easy Maintenance: Room-side filter access allows for easy changing of HEPA filter and UV lamps. Protective grill is removed via four ¼ x 20 grill screws, allowing for access to internal components. As such, maintenance personnel are not required to go above the ceiling to perform routine service. Furthermore, each unit has an external LED indicator to show when the UV lamps need to be replaced, and the unit contains a digital differential pressure gauge to monitor HEPA filter replacement.

Wall-Mount Controls All controls for the PAS220/240 are wall mounted for easy access. All indicator lights, the digital HEPA monitor, and the variable speed control can be wall-mounted and located anywhere in the room for convenient use and easy monitoring.